STATE OF CALIFORNIA
ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION

In The Matter Of Implementation of Restructuring Legislation (Public Utilities Code § 381, [AB 1890]): RD&D	)	Docket No. 96-RDD-1890

STRATEGIC PLAN REPORT ON

IMPLEMENTING THE RD&D PROVISIONS OF AB 1890

(MARCH 13, 1997 DRAFT)

Submitted to the Califonia Energy Commission's RD&D Committee
Submitted by the Public Interest RD&D Advisory Group
Submitted on March 24, 1997

RD&D STRATEGIC PLAN REPORT

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CHAPTER I: INTRODUCTION

A. BACKGROUND CONCERNING THIS ADVISORY GROUP REPORT

On September 23, 1996, Governor Pete Wilson signed into law landmark legislation that will bring substantial competition to California's electricity industry. (Chapter 854, Statutes of 1996 (AB 1890)). With regard to energy-related research, development and demonstration (RD&D) activities, AB 1890 specifically requires the California Energy Commission (CEC or Commission) to fund certain public interest RD&D efforts that will advance science or technology not adequately provided by the competitive and regulated markets, pursuant to "administration and expenditure" criteria established by the Legislature. (Public Utilities Code Sections 381(a), 381(b)(2), 381(c)(2), and 381(f)). The California Public Utilities Commission (CPUC) is given responsibilities for other specified RD&D activities.

At an en banc hearing on October 16, 1996, the CEC determined that a plan would be developed for implementing the public interest RD&D provisions of AB 1890, and the Commission would also provide input to the Legislature regarding the appropriate administration and expenditure criteria for this RD&D program. The CEC then assigned these matters to its RD&D Committee with directions to (1) conduct collaborative, non adjudicatory, public hearings and workshops on these topics through May of 1997; and (2) prepare a proposed RD&D plan for the full Commission's consideration and adoption by mid-1997.

The RD&D Committee held its initial public hearing regarding these matters on December 2, 1996. Shortly thereafter, an ad hoc RD&D advisory group (AG) was formed to prepare recommendations for

the Committee on implementing the public interest RD&D provisions of AB 1890.

The AG held seven, day-long, public workshops throughout the state from December 17, 1996, through March 24, 1997, and updated the RD&D Committee regarding its work-in-progress at a public hearing held in Sacramento on January 29, 1997. At that time the Committee also received recommendations from the AG regarding appropriate "administration and expenditure" criteria for consideration by the Legislature.

The AG has now completed its **"Strategic Plan Report On Implementing The RD&D Provisions Of AB 1890"** (Strategic Plan Report or Report), and hereby submits that Report to the RD&D Committee for a public hearing presently scheduled on April , 1997. It is the AG's understanding that following the hearing, the RD&D Committee will prepare its proposed Public Interest RD&D Strategic Plan for consideration and adoption by the full Commission early this summer. Actual implementation of the public interest RD&D program, in accordance with the Commission's Final Adopted Strategic Plan, is currently expected to begin on January 1, 1998, as called for in AB 1890.

B. DESCRIPTION OF THE ADVISORY GROUP PARTICIPANTS AND PROCESS

This ad hoc advisory group was open to anyone who wished to participate, and it began work shortly after the Commission's RD&D Committee held its initial hearing on implementing AB 1890 in December of 1996. AG participants represented a broad cross-section of entities concerned with California's energy-related public interest RD&D activities, including representatives from private sector companies, investor-owned and municipal utilities, state and federal research organizations, universities, public interest organizations, and various government agencies.

Numerous participants regularly attended AG workshops throughout the state, and the AG's mailing list contains almost 800 names. (See Appendix 1). Approximately 40 separate parties are now official signatories to this AG report. (See Report Transmittal Letter to the RD&D Committee, dated March 24, 1997).

As noted above, the AG held seven day-long workshops between December 17, 1996, and March 24, 1997, and these workshops were conducted at various locations throughout the state (e.g. San Diego, Burbank, Ontario, San Francisco, Berkeley and Sacramento). Each workshop was publicly noticed well in advance, both by traditional and by electronic publication means, and all workshops were open to anyone who wished to attend.

The AG members agreed to strive for consensus on key issues wherever possible, and to provide an accurate "sense of the group," including pros and cons of different options, when consensus could not be reached. (See Appendix 2 for complete summaries of all workshops). The RD&D Strategic Plan Report reflects the informative and constructive input which resulted from this four month long public process.

C. A BRIEF SUMMARY OF THE STRATEGIC PLAN CHAPTERS WHICH FOLLOW

After the AG reached agreement on its decision-making process, participants turned to the major RD&D Strategic Plan topics on which the Committee and Commission are seeking input. These topics are addressed in the following chapters of this Strategic Plan Report.

Chapter II first identifies the primary "Mission" and "Objectives" which the AG believes that California's energy-related public interest RD&D program (referred to herein as "Energy Research California" or "ERC") should seek to accomplish. The Mission and Objectives contained in Chapter II are also

intended to provide a fundamental framework for the "administration and expenditure" criteria which the Legislature is expected to adopt in August 1997. In essence, the AG recommends that the ERC program be designed to further California's long-standing mission of providing environmentally sound, safe, reliable and affordable energy services and products to its citizens. This mission is to be achieved by focusing on specified RD&D activities, while implementing the ERC program in an efficient, merit-driven, and public manner.

Chapter III identifies the major substantive RD&D categories and objectives on which the ERC program should focus. These focus areas include renewable energy, end-use energy efficiency, environmetally preferred advanced generation, and environmental research. The chapter also sets forth eligibility guidelines, selection criteria, and a selection process by which projects seeking funding from the ERC program can be evaluated.

Chapter IV outlines the means by which the ERC program should be governed. This chapter identifies various governing and/or administrative functions which must be addressed (e.g. policy input, project funding mechanisms, coordination, program evaluation, etc.), and then discusses the role of the governing structure and advisory groups in carrying out these various functions. The chapter and report ends by listing the major remaining steps which must be taken during 1997 if the ERC program is to be fully operational on January 1, 1998, as AB 1890 and the AG itself intend.

RD&D STRATEGIC PLAN REPORT
CHAPTER II: MISSION AND OBJECTIVES

A. BACKGROUND CONCERNING DEVELOPMENT OF THE MISSION AND OBJECTIVES

The RD&D advisory group (AG) initially realized that two fundamentally different types of planning documents are needed to successfully implement California's energy-related public interest RD&D program, to wit: (1) a "Strategic Plan," which broadly describes the overriding "vision" and the general methods for implementing the RD&D provisions of AB 1890; and (2) an "Operational Plan," which subsequently provides the essential details needed to carry out the strategic document. Given the size of this advisory group, and the short timeframe for implementing AB 1890, the AG is only able to make recommendations concerning the Strategic Plan itself; the Operational Plan will have to be developed subsequently by those responsible for actually administering and implementing the energy-related public interest RD&D program. (The AG labeled this public interest RD&D program "Energy Research California" or "ERC," and it will be so referred to throughout the remainder of this report).

With this orientation in mind, the AG quickly reached a consensus on the need to identify the basic "Mission"[1] and an

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[1] The word "Mission" as used in this report means a broad-reaching general statement that provides guidance for the development of goals and objectives. It can be characterized as "where you want to go to" or "what you ultimately want to achieve."

essential set of "Objectives"[2] for the RD&D Strategic Plan. The group also agreed that its strategic statement of Mission and Objectives should be used as the fundamental framework for any "administration and expenditure" criteria which the Legislature subsequently adopts in implementing the RD&D provisions of AB 1890.

In discussing and developing its recommended Mission and Objectives, the AG took note of both the **"Working Group Report On Public Interest RD&D Activities"** (submitted to the CPUC on September 6, 1996), and the many important ideas presented by a large number of RD&D experts who testified before the CEC's RD&D Committee during a day-long hearing on December 2, 1996. (See Appendix 3 for a summary of the **"Lessons Learned"** from that Committee hearing). Based on these outstanding background materials, and the extensive practical experience and knowledge of many of the individuals within the AG itself, the group decided that the Mission and Objectives for the Strategic Plan, and the Legislature's related "administration and expenditure" criteria, should identify the key "substantive" areas of program focus, as well as the major "process" objectives which the ERC program should achieve when being implemented.

A fundamental tenant reflected in the AG's recommended Mission and Objectives is the need for balance between competing imperatives, such as conducting a focussed yet flexible program, which is merit-driven and efficient but also responsive to public input and concerns. With this background in mind, we now turn to the Mission and Objectives recommended to both the Commission's RD&D Committee and to the Legislature.

B. MISSION AND OBJECTIVES FOR THIS PUBLIC INTEREST RD&D

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[2] The word “Objective” as used in this report means a statement of intent that leads to the attainment of the mission, but is not necessarily focussed or measurable.

PROGRAM

The Mission and Objectives set forth below were developed as an integrated set of policies to provide direction for the ERC program. Thus, for example, while concepts included in the Mission statement are not specifically restated in the Objectives, all elements should be considered to be of equal importance in the Strategic Plan.

Moreover, in order to maintain California's national and international leadership role in the field of energy, the Legislature should embody the following Mission and Objectives in any "administration and expenditure criteria" which it may adopt when implementing the RD&D provisions of AB 1890.

MISSION: The mission of “Energy Research California” is to conduct public interest energy research that seeks to improve the quality of life for California’s citizens by providing environmentally sound, safe, reliable and affordable energy services and products. “Public interest energy research” includes the full range of research, development and demonstration activities that will advance science or technology not adequately provided by competitive and regulated markets.

OBJECTIVES: The objectives of "Energy Research California" are to:

#1. Develop and implement a robust public interest RD&D portfolio of projects that addresses California’s energy needs and primarily focuses on end-use energy efficiency, environmentally preferred advanced generation, renewable energy technologies, and environmental research.

#2. Create and maintain a public interest RD&D program that balances risks, timeframes and public benefits in a manner consistent with California’s energy policies.

#3. Create a public interest RD&D knowledge base that will allow citizens, businesses, government and other entities to make informed decisions concerning energy technologies and services.

Option #4(A). Support public interest RD&D projects that are connected to the market by (a) assisting in the assessment of energy technologies and market needs; and (b) assisting in the transfer of technologies from RD&D into the marketplace.

Option #4(B). Support public interest RD&D projects that will foster: (a) the development of energy technologies and services which have the potential to be cost-competitive in an evolving deregulated electricity marketplace; and (b) the effective transfer of pre-commercial technologies and services into a competitive marketplace.

Option #4(C). Ensure the relevance of the project portfolio to the State's economy by (a) incorporating the assessment and understanding of market needs into appropriate phases of projects; (b) facilitating the transfer of ERC RD&D into the marketplace through partnerships: (c) collaborating with market and public-interest stakeholders to determine research needs; or (d) considering market needs during program planning.

#5. Ensure public input and accountability for the public interest RD&D program by: (a) conducting an open and flexible planning and decision-making process which involves stakeholders in both planning and implementing the program; (b) using advisory committees and expert panels to guide programs and evaluate project proposals; and (c) using an independent group for periodic overall program review and evaluation.

#6. Ensure the efficient administration and stewardship of public interest RD&D funds by: (a) implementing a streamlined project acquisition and funding process; (b) using prescribed project evaluation criteria to select projects based on technical merit; (c) leveraging limited public interest RD&D funds through public/private partnerships to the extent possible; (d) managing projects flexibly and effectively; (e) establishing a personnel process which will attract and retain motivated individuals with technical knowledge; and (f) avoiding excessive overhead costs.

#7. Provide leadership and coherence for California's public interest RD&D efforts by: (a) coordinating with public and private RD&D entities; and (b) integrating this effort with the Energy Efficiency/Renewables programs and other public interest energy efforts.

C. ISSUES CONCERNING THE RECOMMENDED MISSION AND OBJECTIVES

While the AG held extensive and animated discussions during its "word-smithing" of the Mission and Objectives above, there was remarkable unanimity within the group on virtually all of the major points contained therein. Only three issues warrant any further discussion in this report.

First, a few members of the group raised concerns about whether the Mission of the ERC program should focus exclusively on "electricity" as opposed to "energy" products and services, since electricity ratepayers alone are presently required to pay for the RD&D surcharge. While this "equity" concern was readily understood by the group, it was pointed out that many RD&D efforts often cut across energy lines, thereby impacting electricity users even when electricity *per se* is not the focus of the inquiry (e.g. RD&D concerning leaky air ducts can provide significant benefits for both natural gas and electricity customers). In keeping with its preference for granting reasonable flexibility to the ERC administrator wherever possible, the AG decided to use the word "energy" rather than "electricity" in its recommended Mission statement.

Second, the group discussed whether the "efficiency" focus in Objective #1 should be limited to "end-use" efficiency only. It was noted that RD&D activities pertaining to "generation" efficiency may be viewed by some as more appropriate for the competitive sector to fund, particularly given the rapidly emerging deregulation of the generation market. However, other group members pointed out that not all areas of "generation" research are competitive, and that many ongoing market failures continue to exist in the area of advanced generation. After considerable discussion, the AG agreed that the ERC program should focus on both end-use energy efficiency and environmentally preferred advance generation, as well as renewable technologies and environmental issues.

Finally, the group could not quite bridge the word-smithing gap in its efforts to articulate Objective #4. The AG is concerned with insuring that public interest RD&D efforts are sufficiently "connected to the market" to avoid the so-called commercialization "Valley of Death," in which successful RD&D projects nevertheless fail to yield commercially useful products and services, thereby effectively wasting the RD&D funds which have already been

expended. However, the group is also aware that public interest RD&D funds are extremely limited, and should not be used for near-term "commercialization" efforts which are better funded by other public interest programs (e.g. the Renewables and/or the Energy Efficiency programs) or by the private sector itself. In the end, three different versions of Objective #4 have been presented for the Commission's consideration, and each of these options seeks to address the "commercialization" balancing issue which is described above.

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CHAPTER III: RD&D FOCUS AREAS AND SELECTION PROCEDURES

A. INTRODUCTION

The Mission and Objectives discussed in Chapter II of this report are intended to provide overall guidance for implementing the ERC program. Chapter III provides further detail regarding the primary focus areas and objectives of the program, as well as the eligibility and selection criteria for evaluating specific proposals. Given the uncertain yet dynamic conditions brought about by deregulation and other factors, it is vital to build flexibility into the process so that the ERC portfolio can be responsive to changing "technology-push" and "market-pull" factors across the spectrum of public interest energy RD&D activities.

The advisory group (AG) has identified four primary focus areas for the ERC program. These are listed in Objective #1 of Chapter II as end-use energy efficiency, environmentally preferred advanced generation, renewable technologies, and environmental research.

The **"Working Group Report on Public Interest Research, Development and Demonstration Activities,"** submitted to the CPUC on September 6, 1996, recommended three primary focus areas for the public interest RD&D program, to wit: energy efficiency, renewable technologies, and environmental research. This was the starting point for the AG's discussions regarding the proper focus areas for the ERC program. However, the CPUC report did not make clear whether "energy efficiency" was limited to "end-use"

efficiency or whether it also included RD&D activities for advanced generation as well. As mentioned in Chapter II, above, the AG concluded that the ERC program should provide focus areas in both end-use energy efficiency and environmentally preferred advanced generation, as well as in renewable technologies and environmental research. Chapter III expands on these topics by providing definitions, issues and objectives for each of the four focus areas.

The four focus areas listed below are intended to provide strategic guidance, and are not intended to define specific program structure. Possible ways of structuring the ERC programs include organizing by energy sectors, by types of solicitations, or by the selected focus areas. The program structure should be defined in the Operational Plan. The ERC administrator(s), in coordination with advisory committees at both the policy and technical levels, should develop specific criteria for funding projects and activities in each of the focus areas.

In addition to the four focus areas listed below, some ERC funding should also be dedicated to **strategic energy RD&D** projects and activities. This strategic effort would include RD&D activities that cut across two or more of the focus areas, represent potential "orders of magnitude" advances, or provide energy-related public interest information assessments and/or innovations that do not fit within the other focus areas.

"Cross-cutting" strategic energy RD&D activities could include system-related projects such as distributed generation that utilize renewables, energy efficiency and environmental technologies in an integrated manner. Examples of strategic RD&D efforts that could provide "orders of magnitude" benefits include: (1) innovative projects and activities that result in "revolutionary" (versus "evolutionary") technological advances; (2) the development of "enabling" technologies, i.e. core concepts that create numerous opportunities for the development of

subtechnologies, products and services; and/or (3) the development of "infratechnologies,"[3] i.e. fundamental advances in integrated systems or processes (e.g. advanced metering) that pave the way for competitive development. Examples of topics which do not fit into any of the primary focus areas listed below include assessments of energy-related technology, market or institutional barriers.

Although strategic energy RD&D efforts often entail higher risks than do evolutionary RD&D efforts built on incremental advances, strategic efforts also generally provide higher and/or multiple benefits when they are successful. Thus, there is an important niche for these strategic projects in the ERC portfolio.

Objectives for strategic RD&D efforts include: (1) performing RD&D activities related to "strategic" energy technologies or services, as defined above; (2) obtaining information and performing assessments concerning strategic energy issues; and (3) supporting the strategic integration of new technologies or processes into California's energy system.

B. FOCUS AREAS AND OBJECTIVES FOR THE ERC PROGRAM

It was generally agreed that the focus areas and objectives for the ERC program should be framed broadly and at a high level to allow research providers and the ERC administrator(s) flexibility to pursue innovative concepts and research approaches. Below are descriptions of the four major areas for the ERC program, along with important issues and the objectives for each of these focus areas.

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[3] From "Challenge and Change in Collaborative Research", Ric Rudman and Peter Jaret, EPRI Journal, Jan/Feb 1997

1. Renewable Energy Focus Area and Objectives

Definition: Renewable energy sources include: solar radiation, geothermal brines and steam, biomass, water, and wind available for conversion to energy. Examples include: photovoltaic systems; solar thermal generation and industrial process heat applications; wind turbines; hydropower; generation and direct-use utilization of geothermal resources; and generation or direct utilization through direct or indirect combustion or through conversion of fuels from anaerobic digestion, fermentation or other conversion of biomass residues and wastes to chemical and/or electrical energy. Hybridization of renewable technologies with fossil-fuel fired energy to allow the renewable technologies to be more competitive in a deregulated market is acceptable within the definition of renewable energy.

Renewable energy provides public benefits such as energy diversity and security, improved environmental quality, increased benefits to local and regional economies, improved management of natural resources through the use of indigenous energy resources, and protection of public health and safety.

Issues: The primary issue confronting almost all renewable energy applications is how to compete in a deregulated energy market. Recognizing this dilemma, the Legislature established a $540 million four-year fund under AB 1890 to help existing, new, and emerging renewables transition to a competitive market. However, there is also a need for RD&D to advance renewable technologies toward a cost-competitive stance. Therefore, one of the ERC focus areas is renewables. The ERC management should coordinate its renewable energy RD&D activities with the AB 1890 Renewables program in order to realize synergies between the two efforts, help establish the market connection for renewables emerging from RD&D, and to avoid unnecessary duplication.

Opportunities also exist for most renewable technologies to overcome critical technical barriers in the areas of reducing environmental impacts, increasing efficiency and tapping the benefits of system integration. ERC funding should be made available for these types of activities.

Objectives in the renewable energy focus area include:

- RD&D concerning new technologies or approaches that enhance the technical proficiency and/or affordability of renewable energy resources;
- Providing analytical tools and information to improve renewable energy products and services; and
- Coordinating with other existing and emerging energy technologies or approaches to enhance the diversity and sustainability of California's energy resources.

2) End-Use Energy Efficiency Focus Area and Objectives

Definition: Improving end-use energy efficiency means to either (a) increase the energy conversion efficiency of end-use technologies, products and services; or (b) reduce the energy consumption of end-use technologies, products and services. An example of increasing energy conversion efficiency is to change the energy efficiency ratio (EER) of an air conditioner from 10 to 12. Adding insulation to a building, which has the combined effect of reducing the size of the air conditioner and the amount of energy it will take to make it comfortable, is an example of reducing energy consumption.

Public benefits achievable in the end-use efficiency focus area include improved air quality, decreased use of fossil fuels, reduced expenditures on energy by consumers and increased statewide and regional economic benefits.

Issues: End-use energy efficiency RD&D activities generally

address the potential for cost-effectively improving the performance of energy-consuming technologies, products and services. In this context, it is important to understand the relationship between higher efficiency choices that are competing for the customer's attention in the market place. Another concern is how to more directly connect RD&D activities to the markets that will use the RD&D results.

In this case, the ERC has a potentially valuable ally in the Energy Efficiency (EE) program established by AB 1890. This program, also using public purpose surcharge funds, will target market transformation activities associated with energy efficiency. The ERC can support RD&D to advance end-use energy information, products, and services to the point where they become candidates for inclusion in the energy efficiency market transformation activities. The ERC administrator(s) should coordinate end-use efficiency RD&D efforts, whenever possible, with the energy efficiency market transformation activities to maximize opportunities to improve the effectiveness of both programs.

Objectives: Objectives in the end-use energy efficiency focus area include:

- RD&D concerning new technologies or approaches that will increase the energy conversion efficiency of end-use technologies, products or services;
- RD&D concerning new technologies or approaches that will reduce the consumption of end-use technologies, products and services;
- Providing analytical tools and information to improve the energy efficiency of end-use technologies, products and services; and
- Coordinating with other end-use energy efficiency programs and research providers to enhance California's end-use energy efficiency efforts.

3) <u>Environmentally Preferred Advanced Generation Focus Area and Objectives</u>

Definition: Environmentally preferred advanced generation is broadly defined to include RD&D activities targeting the development of revolutionary, efficient electric generation technologies using clean natural gas fuels. RD&D efforts in this area should address improvements in generation efficiency, environmental performance and/or cost reductions. Examples of generation systems in this focus area include, but are not limited to, new advanced cycles, fuel cells of all types, and next generation gas turbines.

Benefits from RD&D efforts in the environmentally preferred advanced generation focus area include financial cost savings and improved environmental quality.

Issues: The California Public Utilities Commission has stated that generation-related RD&D efforts should be provided by the competitive market. However, while the competitive market may provide support for those RD&D activities which provide adequate benefits for private-sector entities to capture, it will not provide adequate support for activities with primarily "public goods" attributes. For example, the competitive market may support near-term incremental improvements to commercially available generating products, but it is unlikely to provide adequate support for revolutionary RD&D efforts needed to make significant improvements in generating technologies or to develop advanced generating technologies. Support may be needed to enable some new advanced generating technologies to prepare for competitive participation in the restructured energy markets.

Objectives: Objectives in the environmentally preferred advanced generation focus area include:

- RD&D concerning technologies and processes that would improve the efficiency, cost, and environmental performance characteristics of environmentally preferred advanced generation technologies;

- Providing analytical tools and information to improve environmentally preferred advanced generation;
- Coordinating with other environmentally preferred advanced generation programs and research providers to enhance California's electric system.

4) Environmental Research Focus Area and Objectives

Definition: Energy production, delivery and use affects the quality of our air, the quality and availability of our water resources, the populations and habitat of aquatic and terrestrial wildlife and plants, our aesthetic response to the viewshed, the occurrence of hazardous material and toxic wastes, and our cultural and recreational resources. These impacts are usually difficult to quantify and to separate from impacts from non-energy influences.

The environmental efforts of ERC will aim at reducing, preventing, or mitigating the environmental impacts and costs of energy production and use in California, as well as exploring how new energy applications can solve environmental issues.

Issues: Whenever energy is extracted, collected, converted or utilized there are environmental impacts. The activities in this focus area should be directed at better understanding and reducing the impacts of those processes.

One promising research angle is investigating how new technology applications can be developed to reduce emissions and retain industry in California For example, a furniture manufacturing firm in southern California was in danger of having to leave the air basin due to unacceptable emissions from the conventional volatile finishes it applied to its products. Ratepayer funded research helped the industry design a finish that cured under UV light, resulting in lower emissions. This is the kind of innovative thinking that can help solve California's energy-related environmental challenges.

Specific environmental issues of energy production, delivery, and use for major energy technologies in California should be itemized in the Operational Plan.

Objectives in the environmental focus area should include:

- RD&D concerning technologies and processes for reducing or preventing environmental impacts and related costs of energy production, delivery, and use;
- Providing analytical tools and information to enhance environmental quality beyond current regulatory standards; and
- Coordinating with other energy and environmental efforts to enhance California's overall environmental quality.

C. ELIGIBILITY AND SELECTION GUIDELINES

The eligibility and selection guidelines recommended below can be applied to all RD&D activities under consideration, across all focus areas, and regardless of whether projects are funded through solicited or unsolicited proposals. More specific eligibility and selection criteria will need to be developed through the Operational Plan.

1. Eligibility Guidelines

The eligibility guidelines should become the first level of screening for proposals submitted to the ERC program for funding consideration. At the end of this screening, an eligibility "go" or "no go" decision should be made; either a proposal is judged to be eligible for consideration or not. Projects which are not eligible will not require further expenditure of limited overhead funds. Following are the eligibility screening guidelines recommended for the ERC program:

- Projects must meet the statutory definition of public interest RD&D, i.e.---

  --Advances science or technology which provides benefits to California citizens; and

  --Is not adequately addressed by competitive and regulated markets.

- Projects must be consistent with the ERC Mission and Objectives.

2. Selection Guidelines

Once a proposal is judged to be eligible for ERC funding consideration, it should be reviewed and evaluated according to the following merit-based selection guidelines:

Public Benefits: Evaluate levels of public interest and private benefits compared with the project costs to be funded by the ERC and collaborative participants. Public benefits can include improvements to the quality of the environment, beneficial utilization of indigenous and /or renewable sources of energy, reduction in statewide energy and peak load requirements, increases in the overall efficiency of generation or end-use of energy, and positive impacts on the economies at the regional or statewide levels through e.g. consumer cost savings and creation of jobs.

Quality of Proposed Project: Determine the degree to which the proposed project helps to advance the objectives of one or more of the ERC program focus areas. Evaluate the quality of the proposal to determine if the project goals, objectives and work statement represent technically viable means to resolve the major barriers. Evaluate whether the proposal describes the relationship of related RD&D efforts to ensure the proposal represents a synergistic approach without duplication of effort. Evaluate whether there is a realistic vision for transferring results of the project into the marketplace within a defined timeframe. Evaluate the size of the applicable niche and/or mass markets and gage the likelihood for commercial success. Evaluate whether the budget and timeframe for the proposal are sufficient to achieve the desired results.

Quality of Research Team: Gage the strength and

viability of the proposer's team based on: (1) the knowledge, qualifications and experience of key individuals; (2) the team's past performance and financial stability; (3) the team's plans for, and track record of, transferring research results into the marketplace; (4) the plans for collaboration; and (5) the proposed level of cost-sharing.

Policy Consistency: Assess the technical, market and financial risks of the project and the likelihood of and timeframe for success. Weigh the results of these evaluations with the degree to which the proposal advances the objectives of one or more focus areas, and is consistent with State energy policy, to determine if the proposal fits into a balanced ERC portfolio.

Preferences: Evaluate preferences and other considerations (e.g. project and/or lead entity is located in California).

D. SELECTION PROCESS

The Strategic RD&D Plan should establish the overall ERC program direction through its focus areas and objectives. The merit-based selection guidelines should be the primary basis for project selection. Proposals should be evaluated for consistency with State energy and ERC policy. However, the Strategic Plan should not establish fixed percentages for focus areas or other specific measures of balance, recognizing that program balance will be established in relation to the actual portfolio of existing projects and incoming proposals.

Collaborative and/or cost-shared projects with public and private partners are important to transfer technology and to help ensure the ERC has a lasting commercial benefit. These types of projects may need to offer the protection of intellectual property rights and patents to project participants from the private sector.

The Operational Plan should further guide the implementation of a balanced portfolio of projects. The specific criteria and sequence of the project selection process should be spelled out in

the Operational Plan. This process should be reviewed and updated periodically.

While ERC administrator(s) and advisory and review committees should evaluate new proposals using the eligibility and selection guidelines adapted into a qualitative and quantitative evaluation framework, the selection process may be different for proposals to continue existing projects. The selection process should allow flexibility for the ERC administrator(s) and advisory and review committees to exercise their best professional judgment to identify opportunities for collaboration, potential for cost-sharing, and options for exchange of results. The ERC administrator(s) and advisory and review committees should attempt to maximize synergies among projects and proposals, while ensuring consistency with the ERC program's overall Mission and Objectives.

RD&D STRATEGIC PLAN REPORT
CHAPTER IV: GOVERNANCE OF ERC

A. Overall Governance

The governance structure of ERC must be capable of effectively carrying out the Mission and Objectives of the organization. Therefore, the governance structure should be designed and streamlined to ensure public input and accountability, efficient administration and stewardship of resources (e.g. in contracting, personnel and budgeting), and statewide leadership for California's public interest RD&D efforts.

The ERC should also be able to perform a variety of program functions including technology and market assessments; overall management and review of the projects and program; coordination and collaboration with other research organizations and programs; and providing guidance to its advisory committees.

B. Roles and Functions of ERC

In order to ensure that the public interest RD&D program will be effectively administered, the following roles and functions for the ERC are identified:

1) Policy Implementation - The ERC should provide input to the formulation of state energy policies relating to ERC's Mission and Objectives, with an emphasis on articulating the roles and benefits of public interest energy RD&D. The ERC should also be responsible for implementing state policies related to its Mission and Objectives.

2) Program Planning - ERC planning efforts should be undertaken

at levels corresponding to its organizational structure and funding areas.

The ERC, with input from its advisory/review committees and interested stakeholders, should annually conduct a high-level update of both its strategic and operational plans. These update efforts should address the changing roles and needs of public interest RD&D.

The strategic plan update should provide broad outlines of the appropriate areas of RD&D focus, analogous to the descriptions of RD&D areas and objectives contained in the initial ERC strategic plan. The strategic plan should explicitly recognize the status and anticipated role of multi-year research endeavors within the larger scope of the ERC program.

A second, more specific layer of planning will be conducted as part of the ERC operational plan update. The operational plan update will be prepared by ERC's staff, with advice from the ERC's advisory and review committees. The operational plan update should, among other things, include decisions concerning the continuation of the ERC's multi-year research projects. This aspect of the update will grow in importance as ERC's program becomes established.

The operational plan update should also describe a limited number of high-need/high-benefit public interest RD&D areas in which efforts will be made to initiate new multi-year research projects. This aspect of the update will be especially important in the early years of ERC's operation. In addition to the input of the advisory and review committees, the development of new target areas should use public workshops and other means of obtaining stakeholder input. The process may also draw on the results of "scoping studies" that may be commissioned by ERC, and on the results of investigator-initiated exploratory research projects funded through competitive ERC solicitations.

These ERC planning and updating processes should be designed for maximum simplicity and efficiency, minimum time and resource requirements, and result in strategic and operational plans that are responsive to changing conditions. The plans should be flexible and avoid fragmenting the program with small categorical funding allocations.

3) Establish Project Funding Guidelines and Mechanisms

Funding guidelines should require that all projects be subject to a formal application and review process. Each project funded by the ERC should be in response to a proposal submitted by the applicant and evaluated based on the project's merit and the project's anticipated contribution to ERC's Mission and Objectives. All projects should be evaluated against the eligibility and evaluation criteria listed in Chapter III of this report, and any additional criteria that may be listed in the operational plan.

Proposals to the ERC may be either (a) unsolicited; or (b) in response to either an open or targeted competitive solicitation. Funding mechanisms for ERC projects should include both individual awards and block awards. Individual projects should be funded using contracts, grants or loans as the basis of these funding awards.

Block awards should be available for meritorious proposals submitted to ERC by other RD&D organizations. Proposals for all block awards should be evaluated based on eligibility and selection criteria. In addition, any projects subsequently funded by an RD&D organization receiving a block award should also be evaluated to ensure that these projects are consistent with the ERC's eligibility and selection criteria. Block awards could take the form of either grants or contracts.

4) RD&D Activities - Most of ERC's actual RD&D activities

should be funded through contracts, grants or loans to outside parties. The ERC staff should be allowed to conduct RD&D activities only when it is clear that the staff possesses the necessary expertise and is the most effective means of completing the work in question.

5) Leadership, Coordination and Collaboration With Other Public Interest Programs - In order to develop and maintain California's leadership in public interest RD&D, ERC should at a minimum:

a) seek to leverage and combine other state, federal, and private RD&D funds with ERC projects;

b) create formal coordination and collaboration arrangements with other public interest programs, including those administered by the CEC, CPUC, Energy Efficiency and the Renewables program administrators; and

c) coordinate activities with RD&D being conducted by California investor-owned and municipal utilities, California colleges and universities, national laboratories, private firms, and collaborative research organizations such as the Electric Power Research Institute.

6) Technical Management - The ERC should be responsible for plan updates, technology and market assessments, preparation of solicitations, review of proposals, project management, and coordination and guidance of the advisory and review committees.

7) Program Administration - This function should be streamlined and kept at a minimum. In this function, the ERC will provide overall management and program review.

8) Program Evaluation - In order to maintain an effective and dynamic program that is responsive to the energy needs of California, it is important that the ERC update its strategic and operational plans, evaluate the effectiveness of its program, and look for new opportunities to improve its operation. At a minimum the ERC should:

a) Conduct an annual, internal review of its program, including an annual update of the strategic and operational plans;

b) Oversee a periodic, independent, external program review and evaluation process. The first evaluation should be completed no later than July 1, 2001;

c) Develop qualitative and quantitative measures for determining how well the ERC is satisfying its Mission and Objectives. These measures of success should include program benefits, an open and flexible planning process, effective and efficient program implementation, public accountability, effective collaboration with RD&D infrastructure, program cost effectiveness, and a balanced portfolio of projects.

C. Advisory & Review Committees

Two levels of advisory and review committees should be formed, each responsible for different functions of the ERC. The first level should include a Policy Advisory & Review Committee which will be responsible for making recommendations on overall policy, coordination and linkages to other RD&D organizations, and market connectedness. This committee also would be responsible for overseeing an independent review of the ERC. The second level should include a Technical Advisory & Review Committee which will be responsible for providing technical expertise in reviewing and evaluating proposals for new and ongoing projects, and in evaluating technology issues and needs. Both advisory and review levels should have a flexible structure to allow for changing conditions. In addition, these committees should be able to form subcommittees or appoint special committees to address particular needs or issues as they may arise.

Policy Advisory and Review Committee - This should be a permanent committee composed of high-level executives or appointees, providing overall program policy recommendations, including focus area objectives, operational policies, funding priorities for focus areas, coordination with other RD&D organizations, and a yearly review and evaluation of the market connectedness of the ERC program. The annual review should be

timed so that the results can be incorporated in the following year's plans and activities. The committee will prepare and submit a report of its findings and recommendations.

In addition, an external review committee should periodically conduct an independent evaluation of the ERC's process and programs and make recommendations on how the ERC could more effectively meet its Mission and Objectives. These outside experts should be selected based on their independence, unbiased technical expertise in some aspect of the ERC program, and their experience in working with or managing an RD&D program. To avoid any perceived conflicts of interest, individuals currently employed by the CEC, or by any other organization sitting on the policy advisory and review committee, or by an institution receiving ERC funds, should not be allowed to serve as one of these experts.

To facilitate participation on both the annual review panel and the external review committee, ERC should be willing to pay travel and other expenses related to these meetings for all participants.

Technical Advisory and Review Committee - These should be an ad hoc committee composed of energy RD&D managers or technical energy experts. This committees should be organized according to the ERC structure and provide specific program technical advise and recommendations on technology goals and targets, market need analysis, cross-cutting issues, and funding options. This committee should be allowed to form subcommittees on an ad hoc basis to provide special advise and recommendations on such things as solicitations, proposed review and project selection, project technical assistance, contract management and termination, and technology peer reviews and need assessments.

Participation on these committees should be by invitation only. Travel and other expenses for these committees or subcommittees will only be covered under exceptional circumstances.

D. Remaining "Milestones" To Commencing The ERC Program

In order for the ERC to achieve the goal of having public interest RD&D activities under way by January 1, 1998, several remaining "milestones" must be dealt with before January 1, 1998. Listed below are the major remaining "milestones":

1. CEC adopts the strategic plan June 1997

2. Legislature adopts administrative and expenditure criteria August 1997

3. ERC implements the strategic plan September 1997

4. ERC initiates its solicitation process Fall 1997